Fructo-oligosaccharides (FOS) have received particular attention recently because of their excellent biological and functional properties, namely, as prebiotic compounds. Prebiotic oligosaccharides are defined as non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of members of the bacterial community that inhabits the gut microbiota. They are produced by enzymatic transglycosylation or controlled degradation reactions, in complex synthesis mixtures. However, these commercial products often contain low molecular weight sugars that do not contribute to the beneficial properties of the higher molecular weight oligosaccharides. Low molecular weight sugars include glucose (G), fructose (F) and sucrose (GF), while the higher molecular sugars, namely, oligosaccharides, include 1-kestose (GF2), nystose (GF3) and 1-fructofuranosyl nystose (GF4). Nanofiltration (NF) appears to be an attractive industrial scale technique for purification and concentration of oligosaccharide mixtures. The aim of this work was the concentration of the high molecular weight sugar fraction from the FOS mixture, obtained by fermentation, using a cross-flow cell with a nanofiltration membrane (500 Da NF-YC-05) operating at 5 bar and 25 °C. 0.20 μm molecular weight cut-off microfiltration membranes were successfully used to separate the biomass. As FTASE is intracellular no enzyme was present in the fermentation broth thus a procedure regarding protein separation was not needed. Fractionation of the mixture of sugars was studied using NFYC-05 membranes. The retention of monosaccharides (glucose and fructose) and disaccharides (sucrose), as well as the oligosaccharides (kestose, nystose and 1-fructofuranosyl nystose) was established. The retention yields obtained for the oligosaccharides were 27%, and 8% (w/w) for mono and disaccharides, with a volume concentration ratio of 3.6, as compared to the initial conditions. The fraction of FOS was concentrated during the separation process from 52 to 72% (w/w). These results, although suggesting the potential application of nanofiltration technology for the fractionation in large-scale of oligosaccharides from fermentation mixtures, and therefore suitable to be applied in food industry, require a further optimization.

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Purification of fructo-oligosaccharides by nanofiltration
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Fructo-oligosaccharides (FOS) have received particular attention recently because of their excellent biological and functional properties, namely, as prebiotic compounds. Prebiotic oligosaccharides are defined as non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of members of the bacterial community that inhabits the gut microbiota. They are produced by enzymatic transglycosylation or controlled degradation reactions, in complex synthesis mixtures. However, these commercial products often contain low molecular weight sugars that do not contribute to the beneficial properties of the higher molecular weight oligosaccharides. Low molecular weight sugars include glucose (G), fructose (F) and sucrose (GF), while the higher molecular sugars, namely, oligosaccharides, include 1-kestose (GF2), nystose (GF3) and 1-fructofuranosyl nystose (GF4). Nanofiltration (NF) appears to be an attractive industrial scale technique for purification and concentration of oligosaccharide mixtures. The aim of this work was the concentration of the high molecular weight sugar fraction from the FOS mixture, obtained by fermentation, using a cross-flow cell with a nanofiltration membrane (500 Da NF-YC-05) operating at 5 bar and 25 °C. 0.20 μm molecular weight cut-off microfiltration membranes were successfully used to separate the biomass. As FTASE is intracellular no enzyme was present in the fermentation broth thus a procedure regarding protein separation was not needed. Fractionation of the mixture of sugars was studied using NFYC-05 membranes. The retention of monosaccharides (glucose and fructose) and disaccharides (sucrose), as well as the oligosaccharides (kestose, nystose and 1-fructofuranosyl nystose) was established. The retention yields obtained for the oligosaccharides were 27%, and 8% (w/w) for mono and disaccharides, with a volume concentration ratio of 3.6, as compared to the initial conditions. The fraction of FOS was concentrated during the separation process from 52 to 72% (w/w). These results, although suggesting the potential application of nanofiltration technology for the fractionation in large-scale of oligosaccharides from fermentation mixtures, and therefore suitable to be applied in food industry, require a further optimization.